

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT  
WATER QUALITY CONTROL COMMISSION

REGULATION NO. 73

CHATFIELD RESERVOIR CONTROL REGULATION

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## 73.0 CHATFIELD RESERVOIR CONTROL REGULATION

### 73.1 AUTHORITY

The Water Quality Control Commission is authorized by section 25-8-205, C.R.S. to promulgate control regulations to describe limitations for the extent of specifically identified pollutants that any person may discharge into any specified class of state waters.

### 73.2 DEFINITIONS

See the Colorado Water Quality Control Act and other Water Quality Control Commission regulations for additional definitions.

1. "Background" means the calculated phosphorus loads from surface water and alluvial groundwater, including nonpoint sources and direct precipitation, that does not originate from point source discharges. Background is calculated by subtracting the Reservoir Base-Load and Wasteload Allocations from the Total Maximum Annual Load.
2. "Best management practice" means best methods, measures or practices selected by an agency to meet its nonpoint source control needs. Best management practices include, but are not limited to, structural and nonstructural controls and operation and maintenance procedures. Best management practices can be applied before, during and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters.
3. "Chatfield Watershed" consists of: (a) for Plum Creek, all portions of Plum Creek and its tributaries, including segments 8, 9, 10a, 10b, 11a, 11b, 12 and 13<sup>1</sup> and (b) for the South Platte River, the portions of segments 6 and 7 of the South Platte River<sup>1</sup> downstream of Strontia Springs Reservoir outfall. The Chatfield Watershed is depicted in Figure 1 attached to this regulation.
4. "Chatfield Watershed Authority" means the organization formed by intergovernmental agreement, consisting of the general purpose governments and Title 32 Districts outside incorporated areas within the Chatfield Watershed with point source discharges and/or stormwater control powers.
5. "Effluent limitation" means any restriction or prohibition established pursuant to this regulation, the Colorado Water Quality Control Act or the federal act on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into state waters, including, but not limited to, standards of performance for new sources, toxic effluent standards, and schedules of compliance.

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<sup>1</sup> The stream segments referenced are described in the Classifications and Numeric Standards - South Platte River Basin, Regulation No. 38 (5 CCR 1002-38).

6. "Individual sewage disposal system" means a system or facility for treating, neutralizing, stabilizing, or disposing of sewage which is not a part of or connected to a wastewater treatment works.
7. "Land application" is any discharge applied to the land for land disposal or land treatment and does not include a discharge to surface waters even if such waters are subsequently diverted and applied to the land.
8. "Land Application Return Factor" means (1) For land application sites with an augmentation plan decreed by Colorado District Court, Water Division 1: the return flow percent decreed in that augmentation plan; and (2) For land application sites without an augmentation plan decreed by Colorado District Court, Water Division, or who elect not to use the return flow percent in their decree: the ratio of the area of the land treatment site divided by the sum of the surface areas of all lysimeters.
9. "Land disposal" is any discharge of pollutant containing waters being applied to land for which no further treatment is intended.
10. "Land treatment" is any discharge of pollutant containing waters being applied to land for the purpose of treatment.
11. "Margin of safety" means the additional protective factor in the Total Maximum Annual Load, which accounts for limitations in accuracy of modeling.
12. "Nonpoint source" means, for the purpose of this regulation, any activity or facility other than a point source with wasteload allocation specified at Section 73.3(2)(b), from which pollutants are or may be discharged. For the purposes of this regulation, nonpoint source includes all stormwater runoff, whether sheet flows or collected and conveyed through channels, conduits, pipes or other discrete conveyances.
13. "Point source" means any discernible, confined, and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. "Point source" does not include irrigation return flows.
14. "Reserve/Emergency Pool" means the pool of point source total phosphorus pounds available for allocation to point source wastewater dischargers pursuant to 73.3(2)(g) of this regulation or for emergency allocations to point source wastewater dischargers for a time period not to exceed five years.

15. "Reservoir base-load" means the average measured total phosphorus load reaching the Chatfield Reservoir.
16. "Upper South Platte River Watershed" means all portions of the South Platte River and its tributaries, from the river's headwaters through Strontia Springs Reservoir outfall, including Segments 1a, 1b, 2a, 2b, 2c, 3, 4, 5a, 5b, 5c, and the portions of segments 6 and 7<sup>1</sup> upstream of Strontia Springs Reservoir outfall. The Upper South Platte River Watershed is depicted in Figure 2 attached to this regulation. The Roberts Tunnel transfers water from Dillion Reservoir in Summit County into Segment 4 of the South Platte River.
17. "TMAL" means the Total Maximum Annual Load for Chatfield Reservoir, derived from the sums of the Reservoir Base-Load, Background, and Wasteload Allocations for Chatfield Watershed and Upper South Platte River Watershed, with the Margin of Safety.
18. "Wasteload allocation" means the portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution.

### 73.3 TOTAL MAXIMUM ANNUAL LOAD ALLOCATION FOR TOTAL PHOSPHORUS LOADING AND EFFLUENT LIMITATIONS

1. TOTAL MAXIMUM ANNUAL LOAD ALLOCATION FOR TOTAL PHOSPHORUS LOADING
  - a. Ongoing water quality modeling predicts the total phosphorus loading to Chatfield Reservoir that can be assimilated under a Q10 flow condition of 261,000 ac-ft/year so as not to exceed the water quality standard of 0.027 mg/l total phosphorus is 59,000 pounds per year (lbs/yr). The point sources of phosphorus to the reservoir are limited to 7,446 lbs/yr for point sources with 51,554 lbs/yr allocated to nonpoint and background sources, as provided under Section 73.3(1)(b).
  - b. The total maximum annual load distributions of total phosphorus by sources are based on the formula of Total Maximum Annual Load (TMAL) = Chatfield Watershed (reservoir base-load + background + wasteload allocation) + Upper South Platte River Watershed (reservoir base-load + background + wasteload allocation) + Margin of Safety (MOS). The reservoir base-load represents the average measured total phosphorus load reaching Chatfield Reservoir. An implicit MOS is incorporated into the TMAL allocation of 59,000 pounds/year of phosphorus at 261,000 acre-feet/year. The TMAL total phosphorus poundage allocations are distributed among sources as follows:

Allocation Type	Total Phosphorus Pounds/Year
Total Maximum Annual Load (TMAL) = Chatfield Watershed	59,000 @ 261,000 ac-ft/year 41,070
Reservoir Base-Load	13,400
Background	20,312
Wasteload Allocation (point sources)	7,358
Upper South Platte River Watershed <sup>2</sup>	17,930
Reservoir Base-Load	6,000
Background	11,842
Summit County Wasteload Allocation	88

<sup>2</sup>Loadings from the Upper South Platte River watershed include all point sources upstream of the Strontia Springs Reservoir outfall, including 88 pounds of phosphorus per year from wastewater originating in Summit County and discharged directly into the Roberts Tunnel, and all nonpoint sources above the Strontia Springs Reservoir outfall.

## 2. EFFLUENT LIMITATIONS AND POINT SOURCE WASTELOAD ALLOCATIONS

- a. No municipal, domestic, or industrial wastewater discharge in the Chatfield Watershed shall exceed 1.0 mg/l total phosphorus as a 30-day average concentration, except as provided under section 73.3(2)(e).
- b. The allowed annual wasteload of point source phosphorus in the Chatfield Watershed is limited to 7,358 lbs/yr, allocated among the dischargers as follows:

<u>Facility</u>	<u>Pounds Per year</u>
Plum Creek Wastewater Authority	4,256
Lockheed Martin Astronautics	1,005
Roxborough Park Metro District	1,218
Perry Park Water & San. District-Waucondah	365
Perry Park Water & San. District-Sageport	73
Town of Larkspur	231
Louviers Mutual Service Company	122
<u>Reserve/Emergency Pool</u>	<u>88</u>
Total Point Source Phosphorus Wasteload =	7,358

- c. Phosphorus effluent limits for site approvals and discharge permits in the Chatfield Watershed shall be based on total phosphorus effluent quality of 1.0 mg/l for a 30-day average at the design capacity of the wastewater facility and the annual wasteload allocation specified in this section. A wastewater treatment facility may need to adjust operations for periods of time sufficient to meet the annual phosphorus poundage allocation by producing effluent total phosphorus concentrations below 1.0 mg/l.

- d. Point source dischargers may apply to the Chatfield Watershed Authority for phosphorus trade credits which would allow corresponding increases to a discharger's total phosphorus wasteload allocation. Phosphorus trade credits for point sources shall be based upon reductions of phosphorus from nonpoint sources. The amount of point source trade credit shall be based upon one pound of credit for two pounds of nonpoint source reduction, unless water quality data substantiates greater phosphorus removals, in which case one pound of trade credit may be established by fewer than two pounds of nonpoint source reduction, on a site-specific basis. The Chatfield Watershed Authority will review applications and may approve allocations of phosphorus trade credits to dischargers, subject to review and confirmation by the Water Quality Control Division. Trade credits shall be incorporated into discharge permits by the Water Quality Control Division, as appropriate, and incorporated as proposed amendments to the phosphorus allocation at the next triennial review or rulemaking hearing for this regulation.
- e. Point sources may discharge a total phosphorus concentration of greater than 1.0 mg/l if an agreement has been made with an alternative point source discharger for equal phosphorus reduction. The agreement for alternative treatment must be executed by the owners of both facilities, and the agreement must describe estimated changes in average wastewater flows and performance in treatment of phosphorus. The wastewater facility which agrees to provide the equivalent phosphorus poundage reduction must demonstrate that it is achieving a total phosphorus effluent concentration of less than 1.0 mg/l for a period of time sufficient to remove the equivalent phosphorus load by which the wastewater treatment facility is exceeding its wasteload allocation. The Chatfield Watershed Authority will review and may approve applications for alternative treatment arrangements, subject to review and confirmation by the Water Quality Control Division. Alternative treatment arrangements, including provisions for equivalent phosphorus reductions shall be incorporated as permit conditions in both discharge permits, as appropriate.
- f. The Chatfield Watershed Authority may approve transfers of all or part of one point source discharger's total phosphorus allocation to another point source wastewater discharger. Both dischargers must jointly apply to the Chatfield Watershed Authority for such transfers. Applications for transfer must include an agreement executed by the owners of the facilities specifying changes in average wastewater flows and performance in treatment of total phosphorus. The Chatfield Watershed Authority may approve such point source to point source transfers, subject to the review and confirmation by the Water Quality Control Division. Approved phosphorus transfers may be incorporated as permit conditions in

both discharge permits, if these transfers are not otherwise accounted for by the Water Quality Control Division.

- g. Point source wastewater dischargers may apply to the Chatfield Watershed Authority for allocations of total phosphorus pounds from the reserve/emergency pool, to be applied to the dischargers total phosphorus wasteload allocation. Applications for total phosphorus pounds from the reserve/emergency pool must specify the number of pounds desired from the pool. The Chatfield Watershed Authority may approve allocations of total phosphorus from the reserve/emergency pool, subject to the review and confirmation by the Water Quality Control Division. Approved allocations of phosphorus pounds from the reserve/emergency pool shall be incorporated as proposed amendments to the phosphorus wasteload allocation in section 73.3 at the next triennial review or rulemaking hearing of this regulation.
- h. The Chatfield Watershed Authority may approve phosphorus allocations for new point source wastewater dischargers in the Chatfield Watershed. Phosphorus allocation pounds for such new point source wastewater dischargers may be derived from: (1) withdrawals from the reserve/emergency pool pursuant to 73.3(2)(g); (2) nonpoint source to point source trades pursuant to 73.3(2)(d); (3) point source to point source transfers pursuant to 73.3(2)(f); or (4) phosphorus concentration reductions through alternative treatment pursuant to 73.3(2)(e). New dischargers desiring allocations must submit an application to the Chatfield Watershed Authority specifying the number of desired total phosphorus pounds and how the pounds will be derived as specified in 73.3(2)(h). The Chatfield Watershed Authority may approve allocations for new dischargers, subject to the review and confirmation by the Water Quality Control Division. Allocations for new dischargers shall be incorporated into the new discharge permit by the Water Quality Control Division and incorporated as proposed amendments to the phosphorus wasteload allocation in section 73.3 at the next triennial review or rulemaking hearing of this regulation.

#### 73.4 DETERMINATIONS OF WASTELOAD

For municipal, domestic and industrial discharges, the monthly and annual wasteloads shall be determined as follows:

- 1. Direct Discharge

For each direct discharge, monthly phosphorus loads (pounds) contributed shall be determined based upon the following formula:

Monthly Phosphorus Load (pounds) = Monthly volume discharged (million gallons) X Average Phosphorus Concentration (mg/l) for that month X 8.34.

The monthly volume (million gallons) = the sum of all total volumes of effluent measured at each permitted wastewater outfall ÷ number of measurements.

Average Phosphorus Concentration (mg/l) = the sum of the total phosphorus concentrations (mg/l) of all samples for the month ÷ the number of samples collected during the month.

2. Land Application.

a. Land Treatment. For each land treatment discharge, monthly phosphorus load (pounds) contributed shall be determined based upon the following formulas:

i. Monthly Phosphorus Load

Monthly Phosphorus Load (pounds) = sum of the Phosphorus Masses (pounds) for the month X Land Application Return Factor.

OR

Monthly Phosphorus Load (pounds) = sum of loads from each land treatment site (monthly Phosphorus Mass at each land treatment site X Area Ratio for the land treatment site X Land Application Return Factor for the land treatment site)

ii. Phosphorus Mass

Phosphorus Mass = 8.34 X concentration value (mg/l) for phosphorus determined for the sample X the volume of water applied to the land (gallons) ÷ 1,000,000

iii. Phosphorus Concentration

Phosphorus concentrations for land treatment sites may be monitored either (1) at the land treatment site below the surface and above the seasonal high groundwater level, or (2) in the system prior to land application.

b. Land Disposal. For each land disposal discharge, monthly phosphorus load (pounds) contributed shall be determined based upon the following formulas:

i. Monthly Phosphorus Load



Monthly Phosphorus Load (pounds) = Monthly volume discharged (million gallons) X Average Phosphorus Concentration (mg/l) for that month X 8.34 X Land Application Return Factor.

ii. Monthly Volume

The monthly volume (million gallons) = the sum of all total volumes measured at or calculated for the month for all wastewater land applied.

iii. Average Phosphorus Concentration

Average Phosphorus Concentration (mg/l) = the sum of the total phosphorus concentrations (mg/l) of all samples for the month ÷ the number of samples collected during the month.

iv. Phosphorus Concentration

Phosphorus concentrations for land disposal sites must be measured prior to land application.

- c. Exemption. The Division may determine that a land application discharger has no phosphorus discharge, or a reduced phosphorus discharge, if the discharger demonstrates that: (1) the discharger land applies, or will land apply, at agronomic rates for the specific vegetative species at the land application site, and (2) the discharger has installed, or will install, soil moisture probes or other systems to assure land application at agronomic rates. Further, for such dischargers, the Division may authorize reduced monitoring requirements for discharge volume or phosphorus.
- d. Site Approval. The Division shall use the return flow percent in a decreed augmentation plan to calculate phosphorus discharge loads for the site application of a land application discharger, if the discharger demonstrates that: (1) the discharger land applies, or will land apply, at agronomic rates for the specific vegetative species at the land application site, and (2) the discharger has installed, or will install, soil moisture probes or other systems to assure land application at agronomic rates.
3. Annual Phosphorus Wasteload.

The annual phosphorus wasteload shall be the sum of the 12 monthly phosphorus loads calculated for that calendar year for permitted wastewater discharge points and sites and shall not exceed the wasteload allocations, set forth in section 73.3.

## 73.5 MONITORING AND ANNUAL REPORT

1. Douglas County, Jefferson County, municipalities, districts, corporations, proprietorships, agencies, or other entities with responsibility for activities

or facilities that cause or could reasonably be expected to cause point and nonpoint source pollution of waters in the Chatfield Watershed, shall, in consultation with the Water Quality Control Division, jointly as a watershed association or as separate management agencies prepare and implement a monitoring plan and annually review such plan to ensure that the monitoring addresses water quality problems associated with Chatfield Reservoir.

2. Douglas County, Jefferson County, municipalities, districts, corporations, proprietorships, agencies, and other entities with responsibility for activities or facilities that cause or could reasonably be expected to cause point or nonpoint source pollution of waters in the Chatfield Watershed shall jointly as a watershed association or as separate management agencies submit an annual report to the Water Quality Control Division for submittal to the Water Quality Control Commission by May 15. The annual report shall provide information on water quality monitoring, point source loadings and the status of compliance with discharge permit limits and conditions, nonpoint source loadings and the status of nonpoint source control efforts, recommendations on any new or proposed expansion of wastewater treatment facilities, and recommendations for improving water quality, as appropriate.
3. For point source discharges, the annual report shall include a summary of actual discharge monitoring data for each permit, with average monthly concentrations of phosphorus and the annual phosphorus poundage discharged for each permit.

#### 73.6 NONPOINT SOURCE CONTROLS

1. Douglas County, Jefferson County, municipalities, districts, corporations, proprietorships, agencies, or other entities with responsibility for activities or facilities that cause or could reasonably be expected to cause nonpoint source pollution of waters in the Chatfield Watershed shall implement best management practices for control of erosion and sediments. The Commission shall review the performance in implementation of existing erosion and sediment control programs as submitted by the Chatfield Watershed Authority or management agencies at each triennial review of this regulation.
2. Douglas County, Jefferson County, municipalities, districts, corporations, proprietorships, agencies or other entities in the Chatfield Watershed which have responsibility for stormwater and nonpoint source management shall implement nonpoint source control programs for those areas within their jurisdictions with the goal of reducing nonpoint source phosphorus in the Chatfield Watershed so as not to exceed the 33,712 lbs/yr allocation for reservoir base-load and background.
3. If nonpoint source control programs are not implemented, the Commission may adjust the phosphorus total maximum annual load allocations stated in Section 73.3 of this regulation, alter water quality

monitoring requirements and specify a nonpoint source management program.

4. Constructed structural nonpoint source best management practices shall be monitored by the Chatfield Watershed Authority, agencies, owners, or dischargers to determine total phosphorus removal efficiencies if credits for the controls are to be assigned to point source facilities, as provided under section 73.3(2)(d).

73.7 - 73.10 Reserved

#### 73.11 STATEMENT OF BASIS, SPECIFIC STATUTORY AUTHORITY, AND PURPOSE

The provisions of sections 25-8-202(1)(c), (h) and (2); and 25-8-205; C.R.S., provide the specific statutory authority for adoption of this regulation. The Commission also adopted, in compliance with section 24-4-103(4) C.R.S., the following Statement of Basis and Purpose.

##### BASIS AND PURPOSE:

The Colorado Water Quality Control Commission adopted a water quality standard for phosphorus for the Chatfield Reservoir on August 14, 1984 of 0.027 mg/l total phosphorus measured throughout the water column in Chatfield Reservoir for the months of July, August and September. The standard was based upon water quality data and hydrologic conditions of 1982.

Total phosphorus loading to the Chatfield Reservoir varies with the water yield in the basin. 1982 water quality data and hydrologic conditions were used to determine the phosphorus standard. However, the phosphorus allocations to different sources, as shown in Section 4.7.3 of this regulation, is based on further modeling of phosphorus loadings estimated for both present and future conditions. The estimated loadings are shown in Table 4 of the Chatfield Basin Study and are adopted as part of the 208 Water Quality Management Plan covering the Chatfield Basin. The total allowable pounds of phosphorus estimated in the Chatfield study is 36,400 pounds per year. This total poundage is not expected to cause the 0.027 mg/l numeric standard to be exceeded, although it may be exceeded at higher water yields. The 0.027 mg/l total phosphorus standard was adopted by the Commission with the intent of maintaining the chlorophyll a level in the reservoir at no more than 0.017 mg/l during the growing season. Although a majority of the phosphorus loading to the Chatfield Reservoir comes from background sources from the South Platte River, the control of point and nonpoint sources of phosphorus to the reservoir is essential to maintaining the water quality and the classified uses of the reservoir. Point source effluent limits have been identified which will meet the numeric standard for total phosphorus in the reservoir, based on projections of point source phosphorus loading in the basin and the modeling of different concentrations of phosphorus as an effluent limit. The 0.2 mg/l 30-day average concentration for point source phosphorus can be achieved by mechanical wastewater treatment or land application of effluent, in most cases. This level of treatment can be provided at a reasonable cost.

The Chatfield Basin Water Quality Study of 1988 indicated that if the expected flows of wastewater in the basin were treated to a level of 0.2 mg/l total phosphorus, then nonpoint sources of phosphorus would not have to be reduced until after the year 2000 and the water quality standard of 0.027 mg/l would be maintained.

Section 4.7.4(4) of the regulation requires that an ammonia wasteload allocation be developed for the Plum Creek Basin. The adopted ammonia standards for segments 8, 9, 10a, 10b, and 11b of the South Platte Basin, which are in the Plum Creek drainage, are 0.02 mg/l unionized or 0.06 mg/l. The Plum Creek drainage is shown in the 1988 305(b) report of the Water Quality Control Division as "threatened" for ammonia. The Plum Creek segments, except for 11 and 11a, are classified for water supply uses. Nitrates from wastewater discharges could impact that use. The original scope of work for the Chatfield Basin Study, which was started in 1985, included a wasteload allocation plan for ammonia as one of the tasks. The wasteload plan was not finished at the time of the control regulation adoption.

The Chatfield Basin Water Quality Task Force has not identified controls or practices for nonpoint sources of phosphorus. However, the estimate of nonpoint sources of phosphorus in the Basin is 9,600 pounds per year. This is a significant source and can be attributed mainly to stormwater runoff in the watershed. Best management practices can be used to reduce phosphorus in stormwater. A goal of 50% removal has been set for nonpoint phosphorus reduction. The nonpoint source control plan required by Section 4.7.5 shall determine if 50% removal basin-wide is achievable and weigh the relative costs and benefits. Hence, the regulation requires that a basin-wide control plan be developed for nonpoint sources and submitted by January 1, 1992. The basin wide control plan may examine the potential for trading point and nonpoint source phosphorus as a component of the overall plan. This will allow about three years for further studies and development of institutional arrangements for nonpoint source controls.

Section 4.7.6 provides for an annual report on the Chatfield Basin to be submitted to the Commission for the purpose of updating information about water quality in the Basin and to track progress in implementing this regulation and meeting the adopted water quality standards for the Plum Creek Basin and the Chatfield Reservoir.

The Perry Park Water and Sanitation District requested that the compliance date for meeting the point source discharge limit for total phosphorus in section 4.7.4(1) be changed to January 1, 1993, only for their district. The Division intends to provide advance of allowance funding for planning and design of wastewater facility improvements and intends to provide assistance from the State Revolving Fund so that Perry Park can upgrade their treatment facility to meet the 0.2 mg/l phosphorus limit. Such assistance would be available in 1990 providing that Perry Park can qualify financially for the loan. If loan funds are not available to Perry Park, or problems are encountered in completing the project by January 1, 1991, the Division shall give an extension to the compliance date if Perry Park requests a variance from the control regulation and the variance criteria in section 25-8-205(6) of the Water Quality Control Act is met.

The provisions in section 4.7.4(4), 4.7.5, and 4.7.6 of the regulation are expected to be carried out by a basin-wide group of municipal, county, private, and other entities which

are currently in the process of formulating an intergovernmental agreement. When this organization is formed, it is expected that such basin group will be designated as management agency for the Chatfield Basin.

73.12 Statement of Basis, Specific Statutory Authority and Purpose - Revisions of January, 1993.

The provisions of sections 25-8-202(1)(c) and (2); and 25-8-205; C.R.S. provide the specific statutory authority for adoption of the attached regulation. The Commission also adopted, in compliance with section 24-4-103(4) C.R.S., the following statement of basis and purpose.

BASIS AND PURPOSE

The Colorado Water Quality Control Commission adopted a regulation for control of phosphorus in the Chatfield Basin in June, 1989. The regulation was based on phosphorus controls to meet the in-lake phosphorus standard of .027 mg/l in the growing season and to not exceed .017 mg/l chlorophyll *a* which is the goal for maintaining the beneficial uses of the reservoir. The standards and goals were based on water quality and hydrologic data gathered in 1982. Monitoring data gathered from 1983 - 1991 indicate that the annual phosphorus loading to Chatfield Reservoir is significantly higher than the 36,400 lbs. per year that was estimated in 1984 to be the assimilative capacity of the reservoir, and that the higher total phosphorus loads have not caused the reservoir to exceed the chlorophyll *a* goal of .017 mg/l. Further modeling of the reservoir indicates that the assimilative capacity of the reservoir for a one in ten year flow regime is 59,000 lbs. per year. When the control regulation was adopted in 1989, the wastewater effluent limitation for phosphorus was 0.2 mg/l. Significant costs have been incurred by the dischargers in the basin to upgrade treatment as well as provide on-going operation and maintenance of advanced treatment facilities. Several dischargers in the basin have not been able to obtain financing for advanced treatment facilities to meet the 0.2 mg/l limit. The Commission adopted the recommendation of the Chatfield Basin Authority and the Division that the effluent limit for total phosphorus be changed to 1.0 mg/l as a 30-day average concentration but with an annual poundage allocation for each discharger that cannot be exceeded. This will increase the allowable phosphorus poundage from point sources to 7,358 lbs. per year. The basis of the annual poundage allocations to the dischargers shown in section 4.7.3(2) is the projected wastewater flow in the year 2000 at an effluent concentration of 0.6 mg/l. Although the effluent limit for phosphorus is 1.0 mg/l, some or all dischargers may be required to meet a concentration less than 1.0 mg/l in order to stay within their wasteload allocation if population growth rates increase. It is assumed that advanced wastewater treatment must be provided to achieve a concentration lower than 0.6 mg/l. It is assumed that each discharger can stay within the annual poundage allocation by achieving an effluent concentration between 0.6 to 1.0 mg/l. The change to a maximum allowable concentration of 1.0 mg/l will save the dischargers significant dollars in capital and operational costs through the year 2000 while keeping algae growth in the reservoir within target levels.

Section 4.7.4(4) has been deleted due in part to much slower population growth in the Plum Creek portion of the Chatfield Basin than what was anticipated. Ammonia data has been collected on Plum Creek since the regulation was adopted which indicates that

ammonia concentrations in-stream are low and within the unionized ammonia standard of 0.06 mg/l. Discharge permit limits for total ammonia which are written for design capacity flows at low flow conditions are sufficient to protect the stream without requiring a Plum Creek wasteload allocation for ammonia.

The Commission adopted language which allows for phosphorus credits and trading between point source dischargers and allows point source credits if nonpoint source reductions are demonstrated. This provides for flexibility in point source and nonpoint source phosphorus management while maintaining phosphorus loads within the basin targets and wasteload allocations provided for in this regulation. The Division has administrative authority, after review by the Chatfield Basin Authority, to require documentation of phosphorus reduction and appropriate agreements among parties in the basin to insure that phosphorus credits are justified and that trading arrangements are within the scope of this control regulation.

The Chatfield Basin Authority has spent considerable time within the last year looking at the South Platte watershed, which is the main source of water and phosphorus load to the reservoir, in an effort to assess the potential for nutrient loading reductions. The Authority wishes to investigate whether other dischargers in the upper South Platte basin, such as Woodland Park, Bailey, Fairplay, Florissant, and Alma could reduce phosphorus loading in the future and whether they should be subject to the provisions of this control regulation. This issue is expected to be addressed at the next triennial review of the control regulation.

The Commission added a new section on monitoring to address concerns by the Division of Wildlife and the Division of Parks and Outdoor Recreation that the monitoring program conducted by the Chatfield Basin Authority in recent years may not be sufficient to detect nuisance algae blooms or the conditions that may cause nuisance blooms to occur. The Commission determined that the Water Quality Control Division should take the primary role in determining what the appropriate monitoring parameters and frequencies are, in consultation with other interested parties, so that monitoring data over time will better reflect what is causing water quality problems and may be impacting the beneficial uses of the reservoir. The intent is that the Authority will continue to develop an annual monitoring program which the Division shall have the responsibility to review and recommend changes if needed so that the water quality data will be adequate to assess conditions in the reservoir. Other interested parties shall be provided an opportunity annually to have input on the monitoring plan so that appropriate resources can be directed to address water quality impacts.

A study of phosphorus loadings to Chatfield Reservoir and an assessment of nonpoint source phosphorus in the basin was prepared for the Chatfield Basin Authority by Woodward Clyde Consultants in 1992. The study recommends that structural and non-structural best management practices to control nonpoint source phosphorus be used. A schedule to develop specific projects for phosphorus control is included which recommends that engineering be done in 1993 and 1994 with implementation in 1995. Nonpoint source phosphorus loads are not easily identified and additional time is needed to develop control projects. The Chatfield Basin LEMNA nonpoint source demonstration project will be installed in 1993 and evaluated for phosphorus removal through 1994. Jefferson County has adopted an erosion control and grading regulation effective January, 1992 and Douglas County adopted a drainage criteria and erosion

control regulation in October, 1992. These regulations are expected to reduce nonpoint phosphorus loadings to the reservoir. The provisions of these local requirements will be made part of the discharge permit conditions of any stormwater permits which are issued by the Division for construction projects in the basin, industrial activities, and for any municipalities that may be covered by municipal stormwater permits in the future. If progress in implementing best management practices to control nonpoint phosphorus is not evident in future years and if county and/or municipal governments in the Chatfield Basin are not enforcing ordinances or regulations to control such sources, then the Commission will consider imposing further restrictions on point source dischargers through reduced wasteload allocations and/or more restrictive effluent limits. Specific plans for monitoring of nonpoint source phosphorus loads in the basin must be periodically submitted to and approved by the Division and progress in controlling nonpoint sources will be reviewed at each triennial review of this control regulation.

PARTIES TO THE RULEMAKING HEARING  
JANUARY 4, 1993

1. Town of Larkspur
2. Martin Marietta Corp.
3. Roxborough Park Metropolitan District
4. Colorado Division of Wildlife
5. City & County of Denver
6. Douglas County
7. Chatfield Basin Authority
8. Plum Creek Wastewater Authority
9. Perry Park Water and Sanitation District

73.13 STATEMENT OF BASIS, SPECIFIC STATUTORY AUTHORITY AND  
PURPOSE (1996 REVISIONS)

The provisions of sections 25-8-202(1)(c) and (2); and 25-8-205; C.R.S. provide the specific statutory authority for adoption of the attached regulation. The Commission also adopted, in compliance with section 24-4-103(4) C.R.S., the following statement of basis and purpose.

BASIS AND PURPOSE

The Chatfield Basin has been designated as the Chatfield Sub-watershed through the Denver Regional Council of Government's Clean Water Plan. The basin boundary has been modified to a watershed boundary with recognition of drainage from Park County. This control regulation only applies to the Chatfield Sub-watershed portion of the South Platte Watershed.

A modification of the definition of "Chatfield Basin Authority" was considered but not adopted. The proposed definitional change would have described industrial dischargers as "ex-officio members." The purpose of the proposed modification was to describe the status of industrial dischargers such as Lockheed Martin Astronautics, who are assigned a phosphorus wasteload allocation and work closely with the Authority in an advisory capacity, but are not full member signatories to the intergovernmental agreement creating the Authority. A description of the role of these industrial dischargers was

deemed unnecessary in this control regulation. The relationship between industrial dischargers and the Authority is already defined by the Chatfield Basin Authority Agreement.

The previous control regulation did not define the water quality conditions which established the reservoir total phosphorus load at 59,000 pounds per year. This 59,000 pound per year total phosphorus load is based on the reservoir's capacity to assimilate total phosphorus from all sources and not exceed the reservoir standard of 0.027 mg/l. The 59,000 pounds per year is related to a one in ten year recurrence low flow condition ( $Q_{10}$ ) which corresponds to 261,000 ac-ft per year of flow through the reservoir. Therefore, the allowable total phosphorus pounds reaching the reservoir which will not cause an exceedence of the total phosphorus standard is flow dependent.

The point sources of total phosphorus from the Chatfield Sub-watershed are limited to 7,358 pounds per year. The remaining annual total phosphorus load of 51,642 pounds is attributable to a combination of nonpoint and background sources derived from the entire South Platte Watershed. Since limited water quality data exists on the distribution of total phosphorus in the watershed caused by precipitation to the reservoir and base-flow in South Platte River portion of the watershed, a wasteload allocation specific to background sources can not be reasonably estimated from available data. As a result, the control regulation should not separate the total phosphorus allocation between background and nonpoint sources. The Chatfield Basin Authority should evaluate these background and nonpoint source allocations and report to the Commission at the 1998 Triennial Review.

The Authority recommends that wasteload allocation processes be consistent between adopted basin or watershed control regulations. The land disposal and land application wasteload definitions and determinations as adopted in the Cherry Creek Basin Control Regulation have been incorporated into the Chatfield Sub-watershed Control Regulation. This will allow the Authority and the Division to more efficiently administer land disposal or land treatment wasteloads.

A new section has been added to allow point source to point source trading for total phosphorus. A wastewater treatment facility could be authorized to exceed the 1.0 mg/l effluent limit or allocated wasteload for phosphorus, if an alternate permitted facility makes an equivalent reduction in either effluent limit or wasteload allocation. This provision will allow for flexibility among permitted facilities to accommodate unexpected growth and development.

The Chatfield Basin Authority submitted a nonpoint source compliance report to the Water Quality Control Commission in January 1996 which was approved. A summary report defines the nonpoint source management program and ongoing activities of the Authority. The Authority will continue to maintain a nonpoint source management program. Structural best management practices constructed within the watershed will be evaluated by the Authority to determine the total phosphorus removal efficiencies. This efficiency data can be used in assigning nonpoint source credits to point sources as part of a phosphorus trading program.



A change to the annual report from the Authority to the Commission was made. The annual report will be made available to the Commission on or before May 15 of each year which covers the pervious calendar year.

PARTIES TO THE RULEMAKING HEARING  
SEPTEMBER, 1996

1. Chatfield Basin Authority
2. Lockheed Martin Astronautics
3. The City of Westminster

**73.14 STATEMENT OF BASIS, SPECIFIC STATUTORY AUTHORITY AND PURPOSE; JULY, 1997 RULEMAKING**

The provisions of sections 25-8-202 and 25-8-401, C.R.S., provide the specific statutory authority for adoption of the attached regulatory amendments. The Commission also adopted, in compliance with section 24-4-103(4) C.R.S., the following statement of basis and purpose.

**BASIS AND PURPOSE**

The Commission has adopted a revised numbering system for this regulation, as a part of an overall renumbering of all Water Quality Control Commission rules and regulations. The goals of the renumbering are: (1) to achieve a more logical organization and numbering of the regulations, with a system that provides flexibility for future modifications, and (2) to make the Commission's internal numbering system and that of the Colorado Code of Regulations (CCR) consistent. The CCR references for the regulations will also be revised as a result of this hearing.

**73.15 STATEMENT OF BASIS, SPECIFIC STATUTORY AUTHORITY AND PURPOSE (1999 REVISIONS)**

Sections 25-8-202 and 25-8-205, C.R.S., provide the specific statutory authority for adoption of the revisions to this regulation. The Commission also adopted, in compliance with Section 24-4-103(4), C.R.S., the following statement of basis and purpose.

**BASIS AND PURPOSE**

The 1999 Revisions to the Chatfield Reservoir Control Regulation ("Control Regulation") address two major substantive issues: (1) phosphorus allocations, and (2) land application discharges.

The revisions pertaining to phosphorus allocations have two primary purposes. First, the revisions clarify and slightly modify the total maximum phosphorus allocation for the Chatfield Reservoir ("Reservoir") and describe in greater detail how the allocations were calculated and distributed. Second, the allocation revisions amend and expand mechanisms for point source dischargers in the Chatfield Watershed to obtain additional phosphorus wasteload allocations.

The revisions concerning land application were adopted for two reasons. First, the modifications introduce a land application return factor into the formulas used to calculate phosphorus wasteloads for land application discharges. This change

coordinates aspects of the state augmentation plan process (as decreed in Water Court and administered by the State Engineer) with Control Regulation requirements. Second, the land application revisions clarify and define certain monitoring and reporting requirements for land application dischargers.

Finally, in addition to the phosphorus allocation and land application modifications, this action also implements minor, miscellaneous changes.

## I. PHOSPHORUS ALLOCATION REVISIONS

### Total Phosphorus Allocation

The 1993 revisions to the Control Regulation established a total aggregate phosphorus allocation – or Total Maximum Annual Load (“TMAL”) – for loadings to the Reservoir of 59,000 pounds per year at a flow of 261,000 acre-feet per year. The 1999 revisions do not modify the overall TMAL of 59,000 pounds per year, but rather, provide additional explanation for the basis and distribution of the loading.

### Explanation of TMAL

The revisions clarify that the TMAL for the Reservoir is based upon the formula of TMAL [59,000 pounds per year] = Chatfield Watershed (Reservoir base-load [13,400 pounds per year] + background [20,312 pounds per year] + wasteload allocation [7,358 pounds per year]) + Upper South Platte River Watershed (Reservoir base-load [6,000 pounds per year] + background [11,842 pounds per year] + Summit County Wasteload allocation [88 pounds per year]) + Margin of Safety. The formula takes into consideration that the Chatfield Reservoir receives phosphorus loadings from both the Chatfield Watershed, which is subject to the restrictions in the Control Regulation, and the Upper South Platte River Watershed, which is currently uncontrolled and outside the scope of the Control Regulation. The Chatfield Watershed, which is depicted in Figure 1, is defined as: (a) all portions of Plum Creek, and its tributaries, including segments 8, 9, 10a, 10b, 11a, 11b, 12 and 13; and (b) the South Platte River downstream of Strontia Springs Reservoir outfall, including the portions of segments 6 and 7 below Strontia Springs Reservoir outfall. The Upper South Platte River Watershed is depicted in Figure 2 and is defined as: all portions of the South Platte River, and its tributaries, from the river's headwaters through Strontia Springs Reservoir, including Segments 1a, 1b, 2a, 2b, 2c, 3, 4, 5a, 5b, 5c and the portions of Segments 6 and 7 above Strontia Springs Reservoir outfall.

### Components of TMAL

The revisions provide an expanded explanation and definition of the various components of the TMAL. Previously, the Control Regulation simply provided that point sources of phosphorus to the Reservoir (wasteload allocation) were limited to 7,358 pounds per year, and nonpoint and background sources (load allocation) were limited to 51,642 pounds per year. The 1999 revisions clarify that the TMAL is comprised of loadings from both the Chatfield Watershed (41,070 pounds per year) and the Upper South Platte River Watershed (17,930 pounds per year), and the revisions explain in greater detail the distribution of the loadings within the two watersheds. The loading allocation of 41,070 pounds per year for the Chatfield Watershed is comprised of: 13,400 pounds per year for “Reservoir base-load,” 20,312 pounds per year for “background,” and 7,358 pounds per year for point source wasteload allocations. The 17,930 pounds per year allocation for the Upper South Platte River Watershed consists of: 6,000 pounds per year for Reservoir base-load, 11,842 pounds per year for

background, and 88 pounds of wasteload allocation to Summit County. For both watersheds, "Reservoir base-load" represents the average measured total phosphorus load reaching the Reservoir. For these revisions, the Reservoir base-load was determined using five years of data, 1993-1997. See DRCOG, Chatfield Historical Report, 1997.

Total "background" for the TMAL, 32,154 pounds per year (Chatfield and Upper South Platte River Watersheds combined), was calculated by subtracting total Reservoir base-load (19,400 pounds per year) and total wasteload allocations (7,446 pounds per year) from the TMAL (59,000 pounds per year). See Section 73.2(1) for definition of background. Background, which also has been sub-divided by watershed, is a significant buffer between total measured loadings (Reservoir base-load + wasteload allocations) and the total allowable loading (TMAL) for the Reservoir.

#### Implicit Margins of Safety in the TMAL

The revisions identify the implicit margins of safety in the TMAL. Although these margins of safety have been incorporated since the TMAL of 59,000 pounds per year was established in 1993 and have not changed, the Water Quality Control Division ("Division") requested further explanation of the margins of safety. The implicit margins of safety were derived from conservative assumptions used in the Reservoir loading model.

The first margin of safety relates to conservative flow assumptions. The annual flow of 261,000 acre-feet/year used to calculate the TMAL figure was established by evaluating a cumulative distribution of flows from six years of data (1985 through 1990) to predict the probability of given annual flows. A conservative assumption of a one in ten year flow, or  $Q_{10}$ , was applied to derive an annual flow of 261,000 acre-feet for the TMAL. The  $Q_{10}$  flow of 261,000 acre-feet/year was utilized to develop the TMAL.  $Q_{10}$  is protective, because there is a 90% probability that the  $Q_{10}$  flows and loads under the TMAL will not be exceeded each year. See Woodward-Clyde Consultants, Nonpoint Source Management Plan for the Chatfield Reservoir, Colorado (Sept. 1992) ("Woodward-Clyde Chatfield Report, 1992"). In response to Thornton's concerns that the TMAL model only relied upon 5 years of data, the Authority has confirmed the validity of the  $Q_{10}$  by recalculating the  $Q_{10}$  using 14 years of available data (1985 through 1998), rather than six. The  $Q_{10}$  recalculated with the larger data set was approximately 255,000 acre-feet, within 3% of the original  $Q_{10}$  estimate. Further, monitoring conducted in the Chatfield Watershed also confirms that this implicit margin of safety exists. Data collected since 1986 substantiate that the TMAL's margin of safety has generally ranged between 15,000 and 25,000 pounds per year. See Denver Regional Council of Governments, 1997 Chatfield Watershed Authority Annual Report (May 1998).

The second implicit margin of safety is a 13% upward bias for total loading to the Reservoir. See Woodward-Clyde Chatfield Report, 1992. The model, therefore, slightly overestimates the amount of phosphorus that will reach the Reservoir each year, a conservative and protective assumption.

The third implicit margin of safety concerns phosphorus concentrations in the Reservoir. See Woodward-Clyde Chatfield Report, 1992; and DRCOG, Chatfield Watershed and Reservoir 1986 – 1995 Historical Data Analysis and Monitoring Program Review (July 1997) ("DRCOG, Chatfield Historical Report, 1997"). Due to the conservative assumptions in the model, phosphorus concentrations in the Reservoir could be 32%

greater (than the 27 mg/l standard in the Control Regulation) and would still attain the chlorophyll a goal of 17 mg/l. Thus, the model provides a 32% margin of safety for phosphorus concentrations in the lake.

#### Upper South Platte Allocations

The 1999 revisions clarify that the loading components from the Upper South Platte River Watershed (Reservoir base-load, background and wasteload allocation) incorporate all point and nonpoint sources upstream of Strontia Springs Reservoir outfall, including 88 pounds per year of total phosphorus from wastewater that originates in Summit County and is discharged into the Roberts Tunnel. See Footnote 2 (Section 73.3(1)(b)). Sources from the South Platte River upgradient of Strontia Springs Reservoir outfall have been identified as either Reservoir base-load sources or background, but the revised Control Regulation does not sub-allocate these South Platte loadings, because loadings from the Upper South Platte River Watershed, including point sources, are not subject to the controls of this regulation. A separate watershed association has been formed for the Upper South Platte River Watershed, and this association should establish, as necessary, allocations for the point and nonpoint sources in the Upper South Platte River Watershed, in order to assure that Reservoir base-load and background limits are achieved in the South Platte above the Strontia Springs Reservoir outfall. (Current monitoring indicates that these upper South Platte base-load and background levels are being met at the Strontia Springs Reservoir monitoring station.)

The TMAL revisions modify one point source wasteload allocation. The total point source wasteload allocation for the Chatfield Watershed remains at 7,358 pounds per year, but the 88 pounds per year that were previously allocated to Summit County point sources have been placed in a “reserve/emergency pool” for future allocations. All sources upstream of Strontia Springs Reservoir outfall, including point sources from Summit County, have now been incorporated into the TMAL as Reservoir base-load, background and wasteload allocation from the “Upper South Platte River Watershed.” (Point sources upgradient of Strontia Springs Reservoir outfall, except Summit County, do not have specific allocations, and such analysis and allocations were beyond the scope of this study.) The remaining wasteload allocations in the Control Regulation have not been modified.

#### Mechanisms for Point Sources

In addition to modifying and explaining the TMAL, the 1999 revisions address four mechanisms for point sources in the Chatfield Watershed to obtain additional phosphorus wasteload allocations. These mechanisms are: (1) nonpoint source to point source trades; (2) alternative treatment arrangements for phosphorus concentration reductions; (3) point source to point source transfers; and (4) reserve/emergency pool allocations. The purpose of the revisions is to simplify and expand options for point sources to acquire additional wasteload allocations for their facilities.

The existing Control Regulation already provides for nonpoint source to point source trades and alternative treatment arrangements for phosphorus concentration reductions. The revisions clarify and modify these two existing mechanisms and also introduce two new mechanisms, point source transfers and reserve/emergency pool allocations.

For the two existing mechanisms, nonpoint to point source trades and alternative treatment arrangements, the revisions authorize the Chatfield Watershed Authority ("Authority") to approve such trades and arrangements. This change was made to simplify and expedite the process for point sources to obtain additional allocations. Also, the Authority, as the entity with primary responsibility for water quality in the Chatfield Watershed, is well qualified to make informed and timely decisions on applications for wasteload allocations. All Authority approvals of trade credits and alternative arrangements, however, remain subject to review and confirmation by the Division. A modification allows trade ratios for nonpoint-point source trades that are less than 2:1, on a site-specific basis, if such lower ratio is substantiated by greater nonpoint source phosphorus removals. The Authority must develop detailed trading guidelines which will set forth, inter alia, the specific criteria and standards for establishing trade ratios less than 2:1, before trades with ratios less than 2:1 will be approved.

The revisions also introduce two new mechanisms for point source allocations: point source transfers and reserve/emergency pool allocations. In point source transfers, one point source discharger may agree to transfer all or part of its phosphorus wasteload allocation to another point source discharger. In reserve/emergency pool allocations, point source dischargers in the Chatfield Watershed may apply to the Authority for phosphorus wasteload allocation pounds from the reserve/emergency pool. Currently, the reserve/emergency pool for future allocations contains 88 pounds per year. As with nonpoint to point source trades and alternative arrangements, the Authority may approve point source transfers and emergency/reserve pool allocations, subject to review and confirmation by the Division.

Finally, the 1999 revisions explicitly provide that the Authority may utilize any of the four mechanisms for additional phosphorus wasteload allocations – nonpoint to point source trades; alternative treatment arrangements for concentration reductions; point source transfers; or reserve/emergency pool allocations – to approve allocations for new point source dischargers not listed at Section 73.3(2)(b).

## II. LAND APPLICATION REVISIONS

### Return Flow Factors

The revisions modify the formula for determining phosphorus loads from land application dischargers by incorporating a "land application return factor" into the equations at Section 73.4 used to determine monthly phosphorous loads for land treatment and land disposal dischargers. The land application return factor represents the estimated percent of water discharged by a wastewater treatment plant utilizing land application that reaches the streams, tributaries, or alluvium in the Watershed system subject to the Control Regulation. Return flows can vary considerably depending on site location and geology.

The revised Control Regulation establishes two simple formulas for determining the specific land application return factor for each land application site: (1) for sites with augmentation plans decreed by Colorado District Court, Water Division I ("Water Court"), the land application return factor for a particular site is equal to the return flow percent specified in the decreed augmentation plan for the land application site; and (2) for sites without decreed augmentation plans or for those who elect not to use the return flow percent in their decree, the land application return factor is equal to the area of the land treatment site divided by the sum of the surface areas of all lysimeters. The

two formulas allow facilities the flexibility to select for their land application return factor either the return flow percents in their augmentation plans or the area ratio of their site.

The augmentation plan return flow percents are premised on the scientific and legal findings of the Office of the State Engineer, Division of Water Resources (“State Engineer”) and Water Court. The return flow percent in an augmentation plan is a scientifically-based figure that will have been previously scrutinized by the State Engineer and judicially decreed in Water Court pursuant to 37-90-137(9)(c)(I), C.R.S. In this administrative and judicial process, moreover, the State Engineer and Water Court already will have considered the unique conditions at the site, including: the location of the site in the Watershed, site geology and hydrology, and the distance from the land application site to streams, tributaries and alluvium. The most common method determining return flow percents for augmentation plans is the Glover technique, which calculates return flow volumes and models the time required for return flows to accrue in a river system. The State Engineer relies on the Glover technique, and other accepted methods and models such as Modflow, to calculate return flow percents for specific areas. Computations are based upon site-specific information for the study area, including physiography, geology, groundwater hydrology, groundwater flux assessments, drainage, and hydrology. The Water Court also has endorsed these methods as appropriate techniques for quantifying return flow factors for the State of Colorado. Because this particular formula utilizes information from decreed augmentation plans, the formula is, as a practical matter, limited to those dischargers at sites covered by augmentation plans that include return flow percentages. This is a reasonable approach, because the information considered and approved in the augmentation plan process establishes a sound, scientific basis for land application return factors. Discharges without augmentation decrees with return flow percentages, or discharges who opt not to use this method, will apply a land application return factor based on the lysimeters and area ratio of their sites.

Consistent with the addition of a land application return factor, the revisions also specify an alternative formula at 73.4, in addition to the existing formula (as amended to include a return flow factor), for determining phosphorus loads from land treatment discharges. The new equation calculates the monthly phosphorus load for a discharger as the sum of the individually-calculated monthly loads from each land treatment site. The new formula accounts for potential return flow variability, because it applies return factors separately for each land treatment site, whereas the existing formula applies one return factor to all of a facility’s discharges. Therefore, if a single discharger land applies to multiple areas with different land application return factors, the new formula reflects these differences, proportionally, in the total load.

#### Phosphorus Concentration

The revised Control Regulation allows land treatment dischargers to sample for phosphorus concentration either (1) at the land application site below the surface and above the seasonal high groundwater level, or (2) in their systems prior to land treatment. The revisions also confirm that concentrations for land disposal discharges must be measured prior to land application.

The former version of the Control Regulation did not specify where land treatment discharges must sample phosphorus concentration, but implied that phosphorus concentrations should be measured in lysimeters. The revisions clarify these requirements and authorize land treatment dischargers to either reflect nutrient uptake by soils and vegetation when measuring phosphorus or comply with phosphorus

limitations before land application. If a discharger chooses to measure phosphorus below the surface, the facility may use lysimeters, piezometers, or any other appropriate measurement devices.

#### Exemption

The revised Control Regulation provides that the Division may determine that a land application discharger has no phosphorus discharge, or a reduced phosphorus discharge, if the discharger demonstrates that it land applies at agronomic rates and that it has installed, or will install, soil moisture probes or other systems to assure treatment at agronomic rates. Agronomic rates,

which vary by vegetative species, measure the rate at which plants consume constituents in the soil, like nutrients. Information on agronomic rates for particular species is primarily available from governmental or educational institutions such as Colorado State University. In addition, for such dischargers treating at agronomic rates, the Division may grant a partial exemption from monthly volume or phosphorus monitoring requirements. These provisions are intended to address a common scenario in which a land application discharger treats at very efficient rates and, thus, rarely measures any reportable discharge or phosphorus. The no discharge determination and the exemption allow dischargers that can demonstrate treatment at agronomic rates to avoid burdensome monitoring and reporting requirements.

#### Site Approvals

The revisions provide that the Division shall use the return flow percent specified in an augmentation plan to calculate phosphorus discharge loads for the site application of a land application discharger, if: (1) the discharger demonstrates that it land applies, or will land apply, at agronomic rates for the specific vegetative species at the land application site, and (2) the discharger has already, or will, install soil moisture probes or other devices to assure land application at agronomic rates. This provision encourages dischargers to land apply at efficient, agronomic rates.

### III. MISCELLANEOUS REVISIONS AND ISSUES

The 1999 revisions specifically enumerate Douglas and Jefferson counties as the two counties subject to the requirements in Sections 73.5 and 73.6 for monitoring, annual reporting, and nonpoint source controls. The revisions also clarify that the requirements of Sections 73.5 and 73.6 may be implemented by water quality entities as separate management agencies or jointly as a watershed association. Finally, the revisions provide that the Water Quality Control Commission may adjust TMAL allocations, modify water quality monitoring requirements or specify nonpoint source management measures, if the nonpoint point source management programs mandated in Section 73.6 are not implemented.

Based on issues raised by some of the parties to the rulemaking hearing, the Commission recommended that, for the next triennial review, the Authority and the Upper South Platte Watershed Protection Association, in consultation with the Division, monitor and validate the modeling assumptions and partitioning of load allocations for each watershed proposed in the amended regulation.

### IV SPECIFIC AMENDMENTS

#### Section 73.2 -- Definitions

Definitions for the following terms were added to Section 73.2: “Background,” “Land application return factor,” “Margin of safety,” “Reserve/Emergency Pool,” “Reservoir base-load,” “TMAL,” and “Upper South Platte River Watershed.” Figure 1 also has been updated, and Figure 2, which depicts the Upper South Platte River Watershed, has been added. The term “Chatfield Sub-watershed” has been changed to “Chatfield Watershed” to more properly describe the nature of the watershed area subject to the Control Regulation, and the definition has been modified to clarify that the Chatfield Watershed includes all portions of Plum Creek, and its tributaries, as well as the South Platte River downgradient of the Strontia Springs Reservoir outfall. The term “Chatfield Basin Authority” has been amended to “Chatfield Watershed Authority” to reflect the Authority’s name change. Lastly, the definition of “Nonpoint Source” has been modified to state that nonpoint source means any activity or facility other than a point source in the Chatfield Watershed with a wasteload allocation specified at Section 73.3(2)(b).

### Section 73.3 – Total Maximum Annual Load Allocation

The titles of Sections 73.3 and 73.3(1) have been revised to more properly refer to the total phosphorus allocation for the Chatfield Watershed as a “Total Maximum Annual Load” rather than a “Wasteload Allocation.”

Section 73.3(1)(b) sets forth, in detail, the Total Maximum Annual Load (“TMAL”) for the Chatfield Reservoir. The TMAL is defined as:  $TMAL = \text{Chatfield Watershed (Reservoir base-load + background + wasteload allocation)} + \text{Upper South Platte River Watershed (Reservoir base-load + background + Summit County wasteload allocation)} + \text{Margin of Safety}$ . The margin of safety is an implicit component of the TMAL based upon conservative modeling assumptions. The allocation for the Chatfield Watershed consists of Reservoir base-load, background, and a wasteload allocation for point sources, and the allocation for the Upper South Platte River Watershed is comprised of Reservoir base-load, background, and Summit County wasteload allocation. The Upper South Platte River Watershed allocation also incorporates all point and nonpoint sources upstream of the Strontia Springs Reservoir outfall, including 88 pounds per year of total phosphorus from point source wastewater originating in Summit County and discharged into the Roberts Tunnel. The “Reservoir base-load” for both watersheds represents the average measured total phosphorus load reaching the Reservoir. A table has been added to Section 73.3(1)(b) to enumerate the different components of the TMAL. Both Reservoir base-load and background are comprised of loadings from both the Chatfield Watershed and the Upper South Platte River Watershed.

The 88 pounds per year of total phosphorus allocated to the reserve/emergency pool in the 1999 revisions was previously allocated to Summit County in the prior version of the Control Regulation. The former allocation was premised on a written agreement between Summit County and the Denver Water Department that allowed for the direct discharge of tertiary-treated wastewater effluent into the Robert’s Tunnel, which discharges into the North Fork of the Upper South Platte River near Grant. A DRCOG Technical Memorandum dated November, 1986, which was included as part of the Chatfield Basin Master Plan, quantified the 88 pounds per year from Summit County.

It is still anticipated that treated effluent in Summit County could be discharged into the Robert’s Tunnel in the future. Because the transport of phosphorus from the Upper South Platte River to the Reservoir is not well understood, it is reasonable for Summit County’s allocation to remain with the allocation for the Upper South Platte River Watershed.



Section 73.3(2)(b), which lists specific phosphorus wasteload allocations by individual point source, has been amended to reflect that 88 pounds per year have been placed in a “Reserve/Emergency Pool” for future phosphorus allocations.

Section 73.3(2)(c), which explained the 88 pounds per year allocation to Summit County, has been deleted, and thus 73.3(2)(d) now becomes 73.3(2)(c). And, sequentially, Section 73.3(2)(e) now becomes 73.3(2)(d), and 73.3(2)(f) now becomes 73.3(2)(e).

Sections 73.3(2)(d) (formerly 73.3(2)(e)), regarding allocations of phosphorus trade credits, and Section 73.3(2)(e) (formerly Section 73.3(2)(f)), regarding alternative treatment arrangements for phosphorus concentration reductions, have been amended to allow the Authority to approve trade credit awards and alternative treatment arrangements. All Authority approvals of trade credit allocations and alternative treatment arrangements remain subject to review and confirmation by the Division.

New Section 73.3(2)(f) provides that the Authority may approve phosphorus allocation transfers from one point source to another point source. Both dischargers must jointly apply to the Authority for the transfer with a written agreement that specifies modifications in wastewater flows and treatment performance. The Authority may approve point source to point source transfers, subject to review and confirmation by the Division.

New Section 73.3(2)(g) authorizes the Authority to award allocations from the reserve/emergency pool to point source wastewater dischargers in the Chatfield Watershed. Dischargers desiring allocations must apply to the Authority and specify the number of pounds desired, and the Authority may approve such allocations, subject to review and confirmation by the Division. Reserve/emergency pool allocations will be applied to the discharger’s wasteload allocation and incorporated as amendments to the allocations in Section 73.3 at the next triennial review of the Control Regulation.

New Section 73.3(2)(h) provides that the Authority may approve phosphorus wasteload allocation pounds for new point source dischargers in the Chatfield Watershed. Phosphorus wasteload allocation pounds for such new dischargers may be derived from: (1) the reserve/emergency pool, (2) trade credits from nonpoint source reductions, (3) a point source to point source transfer, or (4) a phosphorus concentration reduction through an alternative treatment arrangement. New dischargers desiring an allocation must submit an application to the Authority specifying the number of desired pounds and which of the four mechanisms will be used to establish the allocation. The Authority has been authorized to approve allocations for new dischargers, subject to review and confirmation by the Division.

#### Section 73.4 – Determination of Wasteload

Section 73.4(1), which previously did not contain a heading, was renamed “Direct Discharge,” and the provisions in 73.4(1) pertaining to land disposal were moved to Section 73.4(2).

Section 73.4(2) was renamed “Land Application” and was reorganized into four subsections, (a) – (d). Section 73.4(2)(a), “Land Treatment,” and section 73.4(2)(b), “Land Disposal,” modify the equations for calculating phosphorus loads from land treatment and land disposal discharges, respectively, by adding a land application return factor to the formulas. Also, section 73.4(2)(a) includes an additional, alternative

formula for determining phosphorus loads from land treatment discharges. In the new formula, monthly loads are calculated by adding the individual monthly loads from each land application site rather than in the aggregate. Sections 73.4(2)(a) and 73.4(2)(b) also were amended to clarify requirements for measuring phosphorus concentration. Section 73.4(2)(a)(iii) provides that land treatment dischargers may monitor for phosphorus either at the land application site below the surface or in their systems prior to land application. Section 73.4(2)(b)(iv) confirms that land disposal dischargers must measure phosphorus before land application.

Section 73.4(2)(c), "Exemption," was added to provide that the Division may determine that a land application discharger has zero phosphorus discharge, or a reduced phosphorus discharge, if the discharger demonstrates that it land applies at agronomic rates and that it has installed, or will install, systems to assure land application at agronomic rates. Section 73.4(2)(c) also authorizes the Division to partially exempt such dischargers from volume or phosphorus monitoring requirements.

Section 73.4(2)(d), "Site Approval," was added to provide that the Division shall use the return flow in an augmentation plan to calculate phosphorus loads for a land application discharger's site application, if: (1) the discharger demonstrates that it land applies, or will land apply, at agronomic rates, and (2) the discharger has installed, or will install, soil moisture probes or other devices to assure land application at agronomic rates.

Section 73.5 – Monitoring and Annual Report, and  
Section 73.6 – Nonpoint Source Controls

In Section 73.5 and Section 73.6, the term "counties" has been replaced by "Douglas County, Jefferson County" to clarify that these two counties are responsible for the monitoring, annual reporting, and nonpoint source control requirements under the Control Regulation. Section 73.5 and 73.6 also have been modified to specify that the requirements for monitoring, annual reporting, and nonpoint source controls may be implemented by individual entities as separate management agencies or jointly as a watershed association. Section 73.6(2) has been revised to clarify that the limitation for total nonpoint sources to the Chatfield Watershed is 33,712 pounds per year (Reservoir base-load + background), and that stormwater and nonpoint management controls in the Chatfield Watershed must be implemented to assure that this limit is not exceeded.

Section 73.6(3) has been modified to provide that if nonpoint source control programs are not implemented, the Commission may adjust phosphorus allocations under the TMAL, amend water quality monitoring requirements, or specify a nonpoint source management program in the Chatfield Watershed.

Section 73.6(4) has been amended to clarify that monitoring of best management practices ("BMPs") in the Chatfield Watershed shall be conducted by one or more of the following entities: the Authority, other agencies, owners of BMPs, or dischargers.

PARTIES TO THE RULEMAKING HEARING

1. Chatfield Watershed Authority
2. Jackson Creek Ranch, LLC
3. City of Thornton
4. Summit County Government Snake River Wastewater Treatment Plan
5. Roxborough Park Metropolitan District

## 6. Plum Creek Wastewater Authority

**Figure 1 Chatfield Watershed**



Figure 2 South Platte River Watershed

